Men are like plants; the goodness and flavour of the fruit proceeds from the peculiar soil and exposition in which they grow.

J. Hector St. John de Crevecoeur

Letters from an American Farmer, 1782

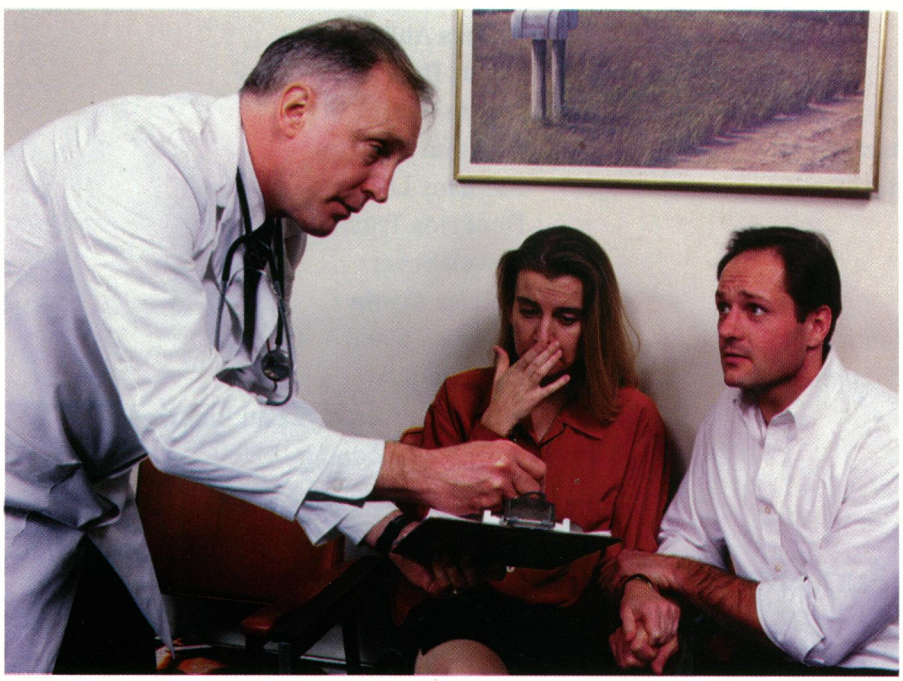
Forum

Environment and Infertility

Diane Aronson is often consulted by couples worried about whether substances they're breathing or eating may prevent them from conceiving a baby. Aronson is executive director of RESOLVE, a national organization for those who experience infertility, a condition that affects an estimated 5.3 million people in the United States. But in her review of the scientific literature on effects of environmental factors on the male and female reproductive systems, Aronson has yet to find a definitive connection between environmental exposures and infertility.

On October 20, Aronson assembled a group of researchers from the EPA, the FDA, the U.S. Public Health Service, and academia to examine the evidence for such a connection. The meeting, "The Environmental Impact on Fertility," held in New York during National Infertility Week, served to point out that, while reduced fertility has not been established as an effect of many perceived risk factors, researchers are looking closely at environmental impact. This emphasis on environmental factors began in Europe, where reduced sperm counts have recently been documented, and spread to the United States, where it has become a topic of discussion at scientific conferences and several federal studies are being developed. "There is a real commitment toward pulling together all the factors," says Aronson. "Just because the studies are inconclusive now doesn't mean that we should relax and say nothing is proven. We think there is enough sufficient evidence to inform people about these possible risks and allow them to make their own decisions."

RESOLVE has published a free primer about potential environmental hazards to fertility. But the slate of unqualified risks seems enormous to any couple trying to modify their environment. About 60,000 chemical substances are used by commerce and industry in Western countries, and 1,000 are introduced annually, but only 5% have been investigated for reproductive effects. Although the EPA says at least 50 widespread chemicals affect reproduction in animals, only four workplace health hazards—lead, ionizing radiation, ethylene oxide, and dibromochloropropane—are regulated in the United States partly because of their effects on human reproduction. The opinion offered by many of the conference's speakers is that the inability to account for the origin of millions of cases of infertility leaves open the possibility that exposure to environmental hazards, from pesticides to household glue to computer display video terminals, may be to blame.



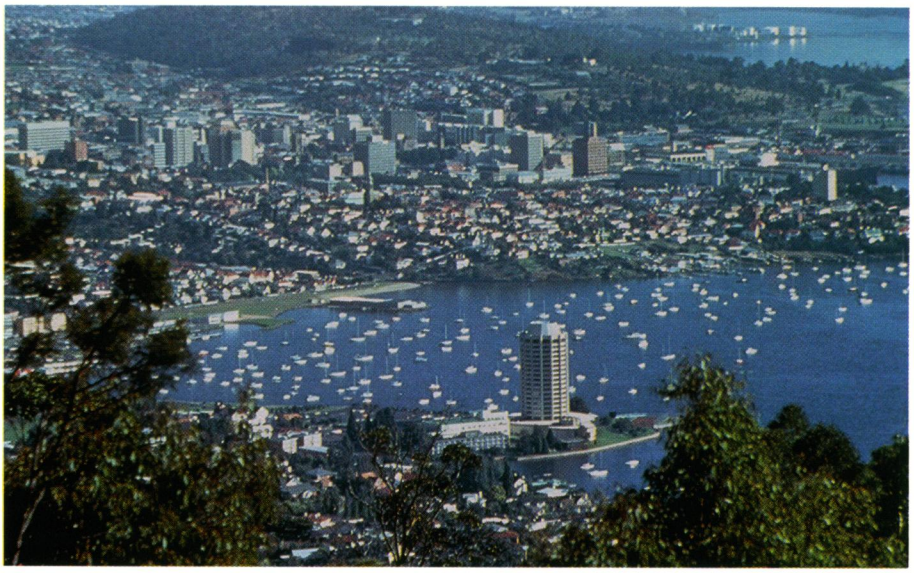
Empty cradles? Researchers are looking at whether environmental hazards may play a role in infertility.

There is strong evidence that environmental estrogens such as DDT are responsible for infertility in exposed animal populations and that high levels of dioxin are toxic to humans. But whether these substances are harming the general population at current levels of pollution and exposure is still unclear, said conference speaker Michael Zinaman, assistant professor of endocrinology and reproduction at Loyola University Medical Center. Among the reasons previous research is inadequate, he says, is that it's not always possible to extrapolate animal studies to human fertility outcomes, exposure to toxicants is impossible to pinpoint, medical histories and working environments change, and sampling studies can't often establish linkages. For example, because none of the recent sperm count studies were designed to measure infertility, Zinaman is conducting an EPA-funded study to determine better ways to measure relative fertility in men. He will soon publish results of a study that sets a normal rate of male fertility to be used as a control population to determine when environmental agents may be producing poorer fertility. Such "normal" rates, however, may include confounding factors such as the impact of environmental estrogens, but, says Zinaman, they at least set a comparative standard. Once such as standard is created, the EPA will launch epidemiological studies to determine if certain chemicals or agents affect fertility. "EPA has a lot of things ready to go once a standard is created," says Zinaman.

But more can be done. The FDA is making progress on testing products with an estrogenic and/or androgenic bioassay. For example, recently, a simple assay found that some plastic baby bottles leach low levels of estrogenic compounds into infant formula. These bottles are no longer produced. "Some government scientists, as well as other researchers, are beginning to understand the importance of such stud-

ies," says Zinaman. "There is absolutely some light ahead in this field." However, there is still no mandate that new drugs and materials be tested for estrogenic/androgenic activities.

At the conference, Mt. Sinai School of Medicine epidemiologist Maureen Hatch pointed to studies that raise infertility issues, including a 1994 Dutch study that implicated farm pesticide exposure and a 1992 Italian study that correlated exposure to high heat with a higher incidence of childlessness and self-reported difficulty in conceiving among ceramic oven operators. Hatch's own unreported research found that job stress and strenuous physical activity among 100 nurses has generally led to longer menstrual cycles of between 33 and 52 days, although a connection to fertility hasn't yet been made. Hatch trusts that such research will be continued and expanded. "The issue is definitely catching on," she says. "With so many people waiting so long to have children, and this narrowing the window of opportunity, they are looking for valid reasons for infertility other than age."



New developments down under. A recent national forum in Australia examined the impact of environmental issues such as global warming, ozone depletion, and hazardous chemicals on human health.

Australian Forum

Australia's health professionals, academic scientists, and health and environmental interest groups were recently urged to become more involved in environmental issues. In his address to the Australian Medical Association first national forum, Our Health, Our Environment—A National Stocktake, recently appointed AMA Federal President David Weedon called for the medical profession to serve as lobbyists to government on environmental issues, particularly global issues such as ozone depletion, global warming, sustainable biodiversity, and the use of toxic industrial, agricultural, and domestic chemicals. Pesticides, with their potential for suppression of the immune system, were targeted for particular attention.

The summit was a new direction for the AMA, which historically has maintained a low profile in the environmental debate. The summit was seen as repositioning the medical agenda away from a curative to a preventive, stance. This would help change Australians way of thinking about their environment, Weedon said.

The "greening" of the AMA's agenda with its strong focus on global issues would help to minimize adverse environmental impacts in Australia, said summit speakers. For example, while there have not been any major outbreaks of Australian encephalitis in the 1990s, the recent diagnosis, for the first time, of Japanese encephalitis in the indigenous people of Northern Queensland and the 1992–1993 epidemic of Ross River fever in South Australia emphasized the potential for new outbreaks of vectorborne diseases such as malaria and dengue.

The meeting focused on impacts of the environment on public health in Australia including lead pollution, ozone depletion, global warming, noise, air and water quality degradation, the inappropriate use of chemicals, and medical and hazardous waste management. Weedon particularly emphasized the potential impacts of ozone depletion in Australia, such as increased incidences of cataracts and skin cancers (140,000 cases per year) adding to the already high national incidence of these conditions.

The summit was opened by the Federal Environment Minister, Senator John Faulkner, and attended by about 170 participants including parliamentarians, leaders from all levels of government, industry, unions, environmental groups, professional medical bodies, and experts in environmental health. Faulkner warned that stressors on the environment were already compromising public health.

A number of national strategies are being developed in partnership with the states and local governments to address environmental health issues. A first national state of the environment report is expected to be available in early 1996 and will provide the necessary benchmarks to measure future progress. There have already been some successes. For example, through round table talks with stakeholders and extensive education campaigns, the lead task force has raised public awareness of the risks to sensitive populations, particularly children. The task force's "lead in petrol" initiative has resulted in more than half a million drivers switching to unleaded fuel within two years. A new phase of public education launched in November and developed in cooperation with state health agencies has targeted possible exposure from old and deteriorating lead-containing paint.

Degradation of the urban air environment is a key government priority addressed by the National Air Quality Management Strategy, which is modeled on the National Lead Abatement Task Force that was created by former Environment Minister Ros Kelly. Respirable particulates and photochemical smog will be the immediate targets of this program.

Patricia Caswell, former executive director of the Australian Conservation Foundation (ACF), focused on the need for community empowerment. Many communities, particularly those associated with the cotton industry and smelting, lack information and legal rights, according to Caswell. She described the Newcastle suburb of Boolaroo, a town adjacent to a lead smelter where about 85% of children had blood lead levels higher than 10 micrograms per deciliter (µg/dl), with peak values approaching 40 µg/dl—4 times the acceptable limit. In this suburb, soil samples contained up to 21,000 parts per million (ppm) of lead, and over 30% of samples taken exceeded 1000 ppm lead. Caswell's comments were expanded by Theresa Gordon of the "No Lead Group"